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AUTHOR Kourilsky, Marilyn
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ABSTRACT

It is believed that if primary grade children are exposed to the fundamentals of economics, they will be better able to comprehend and apply the principles in later years. This paper describes an inservice economics education training institute for elementary school teachers that integrates the following strategies: (1) an experienced-based curriculum; (2) the Generative Model of Teaching (instructional strategies which empower the learner) and the Generative Model of Mislearning and Recovery (preconceptions that are actually misconceptions); and (3) Information Referenced Testing (IRT) (a scoring system which increases the learner's confidence level). The curriculum consists of nine sequential units, each of which follows a 3-step process: experiences, debriefing, and reinforcement. Teachers learned by experiencing a modified adult application of the program. Pre- and posttesting item analysis suggest that teachers exposed to the model increased their confidence levels in economics information from 54 percent to 89 percent. Appendixes provide learner objectives for an integrated teacher education model, IRT responses, total item analysis, item-by-item analysis, and an examinee's individual education plan. (Contains 20 references.) (Author/LL)

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AN INTEGRATED TEACHER EDUCATION MODEL FOR ENHANCED ECONOMIC LITERACY OF PRIMARY TEACHERS

Marilyn Kourilsky

University of California, Los Angeles

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Running Head: AN INTEGRATED TEACHER EDUCATION MODEL

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Abstract

An inservice economic education training institute for primary elementary school teachers provided the context to test a model of teacher training that integrates the following three strategies: (1) a curriculum that is experience-based; (2) instruction that employs both the Generative Model of Teaching and the Generative Model of Mislearning and Recovery; and (3) assessment using the Information Referenced Testing (IRT) procedure. KinderEconomy, the experience-based curriculum, consists of nine sequential units, each of which follows a three-step process: experiences, debriefing, and reinforcement. The teachers learned KinderEconomy by experiencing a modified adult application of its principles. Generative teaching intentionally implements instructional strategies which empower the learner to construct meaningful understandings through generative connections from what is familiar to what is to be learned. The Generative Model of Mislearning and Recovery applies and expands the notion of generative comprehension to deal specifically with preconceptions that are actually misconceptions. Finally, Information Referenced Testing (IRT) is an innovative state-of-the-art two-dimensional scoring system which provides learners with a mechanism for increasing their level of confidence in each answer they provide. Participating teachers exposed to the above model increased their confidence levels in economics information from 54% to 89% and achieved an average final economic literacy score of 97.5%.

An Integrated Teacher Education Model for Enhanced Economic Literacy of Primary Teachers

The recognition of the growing need to increase the economic literacy of the nation's youth, especially those from disadvantaged areas has been translated into mandates in some 28 states. These mandates call for the inclusion of some form of economic education in the high school curriculum in partial fulfillment of graduation requirements. Depending upon the state in question, these mandates range from requiring the infusion of economics into the existing social studies curriculum to the introduction of separate courses in economics with its corollary competency tests (Highsmith, 1989; Buckles, 1992).

Additionally there has been a new emphasis on inservice education for elementary teachers as well as training middle and high school teachers. The belief is that if young children are exposed early to the fundamentals of economics, they will be better able to comprehend and apply these principles when they are taught them in later years. Although there are almost 300 university-based centers for economic education throughout the United States who all share the mission to train K-12 teachers in economic education, there is no well-defined prototypical model of teacher education for implementing this mission. The following is a review of guidelines for an effective teacher training program (Bruno, 1986, 1988; Kourilsky & Bruno, 1992) and discussion of a model (Case Study) of teacher training in which these guidelines

are met. The proposed model for teacher training in economic education is research-informed and strategically combines (1) an experience-based curriculum, (2) generative teaching/mislearning, and recovery, and (3) information referenced testing to increase the economic literacy of its participants.

Guidelines for Effective Teacher Training

First, trainers need to assess the state of knowledge or information in the information base of trainees. The major problem and challenge for the trainer(s) is to pinpoint concept areas where misinformation, lack of information, and incomplete information exist in the knowledge base of the trainee so they can be addressed and remediated by the training program. Thus the assessment process ideally should include measures of the recognition of correct information as well as the confidence in that recognition. Also, the assessment should provide trainers with the information to "fine tune" and individualize the training program curricula in order to meet the unique knowledge base configurations of the particular group or class of trainees.

Second, trainers need to create a situation where trainees can help themselves learn and, in cooperative or conventional learning environments, exhibit their own personal information-seeking behavior.

Third, trainers need to create a flexible learning environment, where trainees, based on the diagnosis of their

initial state of knowledge, can be brought up to the profession's "standard of care".

Finally, an effective training program should include a detailed follow-up with information and instructional materials for trainees who are still not confident or remain misinformed after the training program terminates (Kourilsky and Bruno, 1992).

A Model for Teacher Training in Economics for Elementary School Teachers

The first step in the project was a thirty-hour economics education training seminar which was held on the campus of UCLA (See Appendix A for the goals of the workshop articulated in terms of what the teachers' own pupils will be able to accomplish). Twenty-eight kindergarten through third-grade teachers (and two guests) attended the workshop. Teachers were from the entire Los Angeles area, San Bernadino, and San Diego. All taught in inner-city schools with high percentage of at-risk populations, and all participants volunteered to attend the workshop.

During the first seminar's session participants were taught how to use the Information Referenced Testing scoring procedure (Bruno, 1986, 1988). Then, to establish the participants' base level of economic knowledge, the Test of Economic Literacy (TEL) was used in tandem with the Information Referenced Testing (IRT) scoring technique.

The TEL is a 30-item instrument which has been developed, standardized and published by the Joint Council on Economic

Education.[1] The IRT is an innovative, state-of-the-art, two-dimensional scoring technique.

With the IRT approach, participants were provided with a mechanism for indicating their level of confidence in each answer they provided. This confidence weighting was then systematically incorporated into the scoring of the participants' tests to obtain a more reliable representation of the real information state of the participant. (See Appendix B for an example of the IRT scoring procedure.) The information state was gauged as follows: (1) fully informed, (2) partially informed, (3) uninformed ("I don't know"), or (4) misinformed ("complete confidence in incorrect information"). The IRT provided the teacher trainers with an assessment report broken out by student and economic topic according to the following categories:

- A total item analysis (TIA) for all students--a summary of each student's performance on the pretest and posttest in terms of the weighted score, information state (informed or uninformed), and the student's confidence in correct information on test items, with percentages given in each category.
- A test item-by-test item (concept by concept) list of the numbers of participants who performed within the various information states for each item/concept.
- An individual education plan, (IEP), which provided detailed formative evaluation for each student assessed.

The total item analysis (Appendix C) shows results for each student on the pretest and the posttest. Pretest scores are listed first for each student. Many students achieved a recommended "grade" in the C range on their pretests, leaving them much room for improvement. Note that six participants scored so low, they were considered wholly "uninformed" with regard to basic economic concepts.

The item-by-item analysis (Appendix D) clearly shows a lack of knowledge among participants about money supply and the nature of corporations. In addition, there is rampant misinformation on the concepts of government budget deficits, diminishing returns, shortages, and value of labor. This pre-assessment provided the workshop instructors with the information necessary to tailor the workshop to best meet the needs of the trainees.

Thus the first guideline for effective teacher training, assessing the state of knowledge in the information base of the trainees, was met. Through use of Information Referenced Testing, each participant was assessed for information state in each of the concepts deemed necessary for economic literacy. The required data to "fine tune" and individualize the training program curricula were generated.

Prescriptions were tailored for each trainee to meet the second guideline for effective teacher training--creating an environment where students can help themselves learn. Every student in the class received a printout of his/her Individual

Education Plan (IEP). Appendix E shows a typical example of an IEP in the KinderEconomy workshop. The IEP itemized the overall pre-test performance of the learner as well as performance on each item of the test with cross reference to instructional materials. Diagnostic prescriptions referring the student to appropriate chapters in the required textbooks were offered for all concepts missed. The students, therefore, were able at their own pace to work on an individually prescribed educational plan. Each participant could exhibit his/her own personal information-seeking behavior. In addition, the instructor(s), who also had a copy of every student's individual prescription, could use the individual plans as well as the group and class feedback to map out appropriate instructional experiences.

The third guideline for effective teacher training--creating a flexible learning environment where students' knowledge levels can be brought up to the profession's "standard of care" (in this case, to establish economic literacy) was met as follows: (1) The Generative Model of Teaching (Wittrock, 1974, 1991) was used as the theoretical framework for instructing the teachers in each of the economic concepts of the KinderEconomy; (2) the Generative Model of Mislearning and Recovery (Kourilsky, 1992) was used to resolve any economic misconceptions that remained.

KinderEconomy is designed for kindergarten, first, second, and third grade students. The curriculum spans the course of one semester and provides a comprehensive instructional sequence.

Each of the activities motivates the students by presenting economic concepts in a way that is meaningful and applicable to their lives and their experiences. KinderEconomy integrates the disciplines of social studies, mathematics, language arts, and the visual and performing arts to provide an interdisciplinary approach to teaching economics. Experience-based learning along with simulation and role-playing prepare the students to become effective "Kinder-economists." The KinderEconomy curriculum contains the unit outlines, lesson plans, worksheets, tests, and letters to parents, as well as other supplementary materials needed to implement the program.

KinderEconomy consists of nine sequential units, each of which follows a three-step process: experience, debriefing, and reinforcement. First, the students experience economic simulations in which their reactions determine the outcome of the situation. Then, the teacher debriefs the students about the situation and distills the concepts they have experienced. Finally, the teacher reinforces the experience by providing supplementary activities including fables and plays to extend their knowledge.

The curriculum opens with the introduction of scarcity, in which students must allocate a limited resource--such as a candy bar or ice cream cone--among the entire class. This prepares the students for a more thorough examination of the methods of distribution. Next, students explore the concepts of opportunity

cost and cost-benefit analysis by choosing among alternatives, identifying what they gave up, and deciding whether they made a wise decision. Students will then learn to combine and organize resources in order to most efficiently produce goods or services for the classroom society. Students must eventually implement a banking system, including a money supply, in order to handle the money earned through production and spent through consumption. Students will thus discover the strengths of a currency system in comparison to a barter system. In analyzing the market within their classroom society, the concepts of supply and demand, and the relationship between them, become evident to the students. The curriculum culminates with the establishment of a business venture, integrating all of the concepts learned throughout KinderEconomy (Kourilsky, 1977, 1992).

In generative teaching, which is complementary to an environment of experience-based learning,instructional strategies are implemented which empower the learner to construct meaningful understandings through generative connections from what is familiar to what is to be learned. Generative teaching involves knowing the learners' conceptions or preconceptions of the subject matter and leading them to revise these preconceptions by teaching them to construct two types of meaningful relations: (1) relations between the subject matter concepts and the learners' knowledge and experience, and (2) relations among the subject matter concepts to be learned (Wittrock, 1991).

Successful generative teaching requires the fostering of "a distinctive type and quality of student (attention and) motivation that emphasizes the taking of control and responsibility for being active (and attentive) in learning; for generating meaning from teaching; and for attributing success to active, effortful learning" (Wittrock, 1991, p. 173).

Generative teaching regularly shows positive effects upon the learning of subjects taught in schools, including economics (Kourilsky & Wittrock, 1987; Kourilsky, 1992), reading (Wittrock, Marks, & Doctorow, 1975; Doctorow, Wittrock, & Marks, 1978; Wittrock, 1981; Wittrock & Alesandrini, 1990), mathematics (Peled & Wittrock, 1990), science (Osborne & Wittrock, 1983, 1985), and geography (Mackenzie & White, 1981).

A major challenge to the generative teacher is knowing how to modify students' current understandings, and knowing how to induce learners to generate new conceptions by revising or by transforming their preconceived understandings (Wittrock, 1991; Kourilsky & Wittrock, 1987, 1992). In an experience-based model, learners reveal their current understandings, en vivo, through their behavior and decision-making.

The Generative Model of Mislearning and Recovery (Kourilsky, 1992) applies and expands the notion of generative comprehension to deal specifically with preconceptions that are actually misconceptions. It is predicated on the belief that familiar knowledge and experience can actually serve as an intellectual red

herring that can divert the student toward representations and processes that are inconsistent or in direct conflict with correct understanding. The assumption is that in order to recover educationally from a mislearned concept, it is not sufficient to identify the misconception and then reteach; the instructor has to understand, modify, and in some cases eradicate the underlying mindset of the person which led him/her to the misconception or misinformation.

In those cases where the pretest (or subsequent behavior) revealed misinformation and misconceptions as opposed to lack of information, the teachers were asked in cooperative learning groups to think "out loud" and to attempt to identify and articulate each other's incorrect mindsets that were leading to misconceptions and thus preventing total comprehension of the economic concepts. These misconceptions tended to fall into three categories of incorrect mindsets:

1. Linguistic Mindsets are those incorrect mindsets which derive from natural language usage and the subsequent psychological tendency to identify with the natural language use of the term or concept. These seemingly familiar concepts do not have quite the same meaning in economics that they have in ordinary usage, and in some cases the distinction between economic usage and common usage is subtle. Such linguistic difficulty is exemplified by the concept of scarcity. The word scarce is commonly (and correctly) used to mean rare (infrequently found). But economists employ a

definition of scarcity that has nothing to do with absolute quantities. Students, because of their familiar linguistic mindset, often fail to comprehend that economic scarcity is a relative concept, specifically, an item is economically scarce if its availability is low relative to the desire for it. Another example is the concept of demand. It is not unusual when a student hears the term demand to conjure a familiar image and concomitant mindset of something which is "adamantly desired" or "insisted upon." In economics, demand expresses a relationship between the amount of something that is desired or requested and the amount that must be sacrificed to obtain it; it is "desire" backed by willingness and ability to pay. The concept of investment often invokes an image or mindset of the placement of money into a money market fund or an interest earning account rather than the technical economic usage of investment which is the purchase of resources that are, in turn, used to produce other goods and services.

2. Physical mindsets are those which derive from the individual's physical experience which then leads to an incorrect physical analogy. Such incorrect physical analogies were manifested in the teachers' understandings of graphical representations of many economic concepts including price ceilings, price floors, and supply. For example, an individual will often think of a price ceiling as something higher than themselves and a price floor as something lower than themselves.

Consequently, they psychologically slide into the incorrect analogy (and mindset) that a price ceiling should be portrayed graphically higher than the equilibrium price and a price floor should be drawn graphically lower than the equilibrium price. In economic reality, a price ceiling is a maximum price that can be charged and is commonly physically below the equilibrium price, whereas a price floor is a minimum price which can be charged and is commonly physically above the equilibrium price. Similarly, when an individual is asked to draw an increase in supply, he or she tends to have a mindset that an increase physically signifies movement upward and therefore will represent an increase in supply by a new curve which is physically above the old curve. Unfortunately, as a technical consequence of the orientation of the price and quantity axes for standard economic graphs, an increase in supply is in fact correctly reflected as a movement to the right of the original supply curve.

3. Resistive/psychological mindsets are those which derive from the natural resistance to acknowledge a reality that is in conflict with what the individual believes "ought to be" and the subsequent tendency to psychologically ignore or deny that reality. For example, a typical and familiar mindset of students is that if one has invested a lot of money or effort in a project, he or she should finish it no matter what. They are reluctant to resist the belief that from an economic perspective, if it costs more just to finish the project than the project will ever earn,

it should not be finished, no matter how much it costs. Similarly, if Mr. and Mrs. Baker pay $100.00 for theater tickets, hate the play, and then sit through the entire performance "to get their money's worth," they are only adding to their woes. Many individuals fall prey to what economists call the "sunk cost" fallacy because they resist the psychological acknowledgement that once resources are expended, they are irretrievably sunk. It is often difficult to face that the original decision may have been a mistake, and that the choice is not how to undo the mistake but rather what to do in the present. In other words, they do not appear to recognize the wisdom in the old adage, "don't cry over spilled milk." Instead, they want to "unspill" the milk and believe that if one really tries, he or she can change the past. In the same vein even individuals who understand that scarcity is a relative concept may still have a mindset that causes them to resist its reality. Because they associate it causally with greed, they believe it could (and should) be eliminated by simply curbing the wants of all individuals.

It appears that although the teachers may understand concepts by relating them to familiar knowledge and experience (the Generative Model of Learning), that same familiar knowledge and experience can actually serve as a false path or distractor in mastering certain concepts.

When the cooperative groups in the training seminar were able to identify the incorrect mindset(s) that led to the

misconceptions, it became easier, in the spirit of generative teaching, for the instructor and those students (teachers) who already had mastered the concept to undo/correct the incorrect mindset(s). The teachers reported that once they understood the incorrect mindsets that led to their own misconceptions, they could now anticipate them in advance and therefore attempt to incorporate teaching strategies that would prevent the mindsets from growing into full-fledged misconceptions in their own learners.

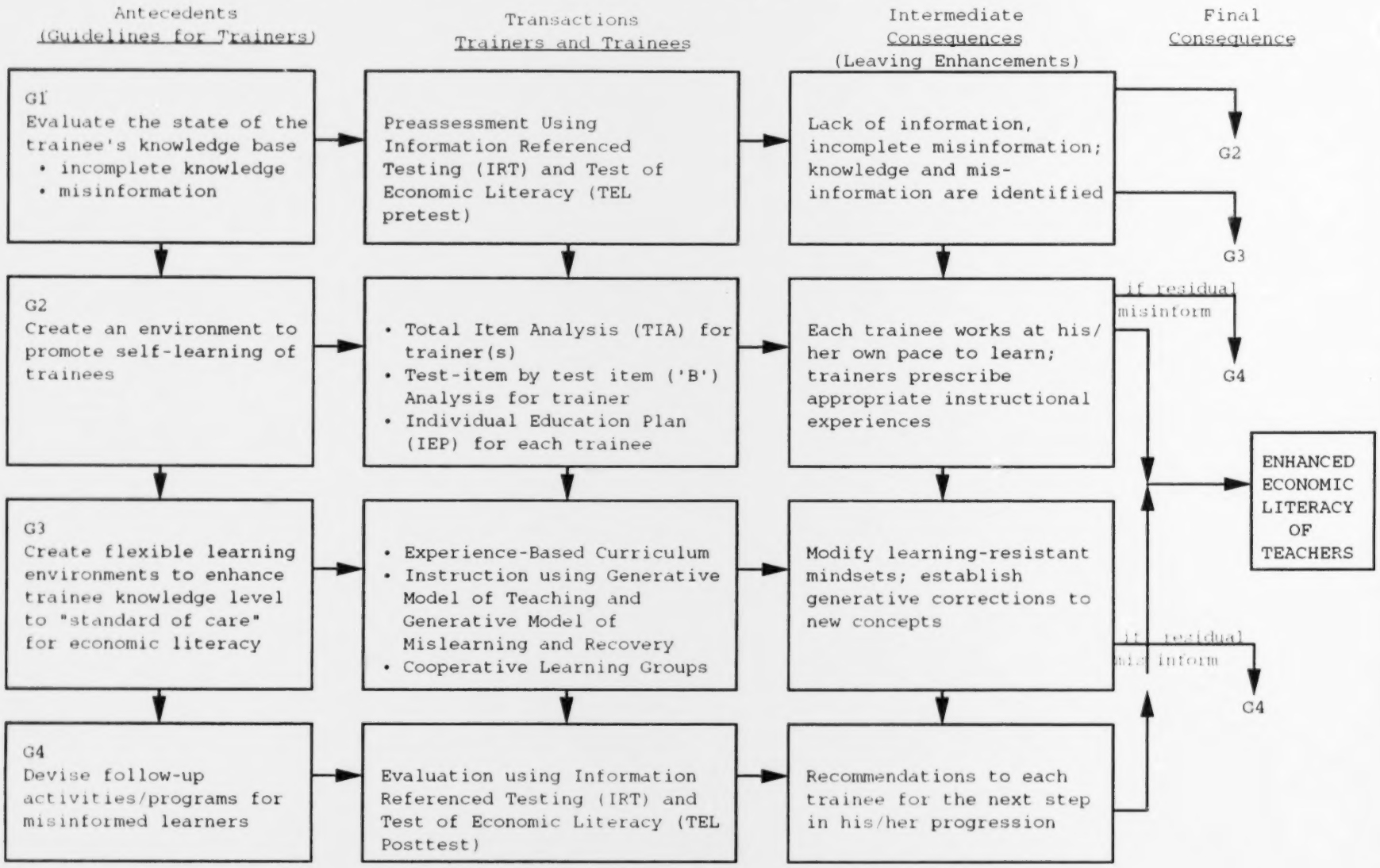
At the end of the training, all participants took the Test of Economic Literacy posttest (a different form from the pretest). Results were ready for them within an hour. The effect was a dramatic increase in economic literacy among all trainees.[2] The average score was 97.5%, and 27 out of the 28 teachers were fully informed. Only one participant still needed review and instruction whereas at the time of the pretest, 24 out of the 28 participants needed review and/or instruction. Their confidence level (percent confidence in correct information) also increased from 54% to 89%.

Thus, in conformity with the final guideline of effective teacher training--providing follow-up opportunities for enhanced learning subsequent to the training program--each participant received another individual diagnostic prescription indicating areas of strengths and weaknesses.

This model of teacher training is replicable and can be applied to secondary and college levels (of economics) as well as to other disciplines.

In sum, the above training model can be viewed as follows:

AN INTEGRATED TEACHER EDUCATION MODEL FOR ENHANCED ECONOMIC LITERACY


Antecedents
(Guidelines for Trainers)
Transactions
Trainers and Trainees
Intermediate
Consequences
(Leaving Enhancements)
Final
Consequence
G1
Evaluate the state of the trainee's knowledge base
• incomplete knowledge
• misinformation
Preassessment Using Information Referenced Testing (IRT) and Test of Economic Literacy (TEL pretest)
Lack of information, incomplete misinformation; knowledge and mis-information are identified
G2
G3
G2
Create an environment to promote self-learning of trainees
• Total Item Analysis (TIA) for trainer(s)
• Test-item by test item ('B') Analysis for trainer
• Individual Education Plan (IEP) for each trainee
Each trainee works at his/her own pace to learn; trainers prescribe appropriate instructional experiences
if residual misinform
G4
G3
Create flexible learning environments to enhance trainee knowledge level to "standard of care" for economic literacy
• Experience-Based Curriculum
• Instruction using Generative Model of Teaching and Generative Model of Mislearning and Recovery
• Cooperative Learning Groups
Modify learning-resistant mindsets; establish generative corrections to new concepts
ENHANCED ECONOMIC LITERACY OF TEACHERS
if residual misinform
G4
G4
Devise follow-up activities/programs for misinformed learners
Evaluation using Information Referenced Testing (IRT) and Test of Economic Literacy (TEL Posttest)
Recommendations to each trainee for the next step in his/her progression

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Footnotes

[1]The two incorrect items most frequently selected as distractors were retained for the IRT adaptation of the Test of Economic Literacy.

[2]The Test of Economic Literacy has been shown in numerous repetitions by the Joint Council on Economic Education not to be a reactive instrument.

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APPENDIX A

I. Objectives

Below are the learner objectives stated in terms of what teachers' own pupils will be able to accomplish.

Scarcity

1. The learner will (TLW) recognize the dilemma of scarcity by being able to define its components and verbalize that there is not enough of everything he or she wants.
2. TLW react to a scarcity situation in a discussion group by offering tentative solutions to the problem of scarcity: first come-first served; race; share; teacher decides; lottery; need; and pay for what you want.
3. TLW give one advantage and one disadvantage for each tentative solution to the scarcity problem.
4. TLW verbalize the three questions faced by all societies: what to produce; how to produce; and for whom to produce.
5. TLW identify the scarce resource in a scarcity situation.
6. TLW select examples of scarcity in a true-false test item.
7. TLW illustrate two alternative uses for a given resource in a test item.
8. TLW Make or cut-and-paste two pictures to illustrate a scarcity situation and label the scarce resource.

Opportunity Cost

1. TLW list a first and a second choice from a list of similar items, such as water colors, pastels, and crayons.
2. TLW list what she or he gave up (opportunity cost) in a certain decision.
3. TLW indicate and be able to verbalize whether she or he made a wise (rational) choice in a certain decision.
4. TLW identify the scarce resource, in a given situation, on a test item.
5. TLW identify the opportunity cost, of a given decision, on a test item.

Production: Goods and Services, Substitutes and Complements

1. TLW participate in a group that will produce a good or service.
2. TLW verbalize the concept of production as creating something that someone else will want to buy.
3. TLW identify selected pictures as those that depict either goods or services.
4. TLW identify complements and substitutes in a concentration-style game.
5. TLW identify goods, services, complements, and substitutes on a matching-type test.

Production and Banking

1. TLW perform a civil servant job in the classroom country.

2. TLW recognize that certain occupations provide higher salaries than others.

3. TLW participate in a market mechanism experience by: 1) producing a good or a service; 2) determining the price of a good or service; and 3) selling a least one item produced.

4. TLW list at least one good and one service she or he produced and state a preference from those listed.

5. TLW open a savings account with classroom currency.

6. TLW fill out a deposit slip.

7. TLW fill out a withdrawal slip.

8. TLW verbalize the meanings of deposit, withdraw, interest, and balance.

Consumption and Earning Income

1. TLW list at least three goods or services purchased during a specified period.

2. TLW identify at least two ways to obtain money, such as: 1) earn it; 2) steal it; 3) borrow it; or 4) be given a gift of money.

3. TLW verbalize the problems and benefits of each way of obtaining money.

Exchange: Money vs. Barter

1. TLW verbalize the concept of barter as the direct trading of one item for another without using money.

2. TLW participate in a barter exchange.

3. TLW verbalize at least one disadvantage of a barter exchange.

4. TLW generalize that it is easier to obtain what you want by using money than by bartering.

Distribution

1. TLW offer in a discussion group, possible solutions to any scarcity problem; i.e., first come-first served, force, share, teacher decides, lottery, need, market mechanism.

2. TLW verbalize advantages and disadvantages for at least three methods of distribution necessitated by the scarcity problem.

3. TLW conduct a market survey of a classmate as to their favorite color and graph the results.

4. TLW survey a parent as to the most fair and least fair method of distribution and graph the results as a precursor to graphing demand.

Demand and Supply

1. TLW verbalize the concept of demand as how much the buyer would be willing to buy at various prices per unit during a given time period.

2. TLW verbalize the concept of supply as how much the seller would be willing to offer at various prices per unit during a given time period.

3. TLW verbalize that as the price goes down, the quantity demanded goes up and as the price goes up, the quantity demanded goes down (the law of demand).

4. TLW conduct a market survey to assess the demand for refreshments by classmates during an Open House.

5. TLW conduct a market survey to assess the demand for refreshments by parents during and Open House.

6. TLW convert a market survey into a demand schedule.

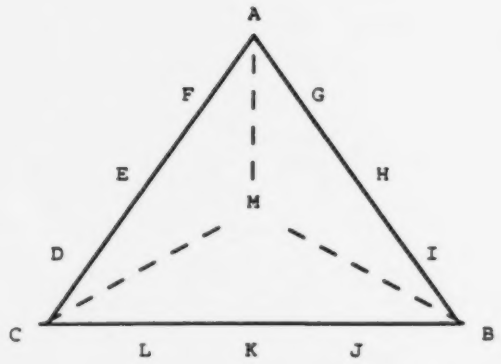
Business Venture: Combining Concepts from Eonomics with Concepts from Business Finance

1. TLW define savings.

2. TLW define buying stock as buying a part ownership in a business corporation.

3. TLW determine whether a profit or loss was make in the business venture by subtracting total costs from total sales.

APPENDIX B



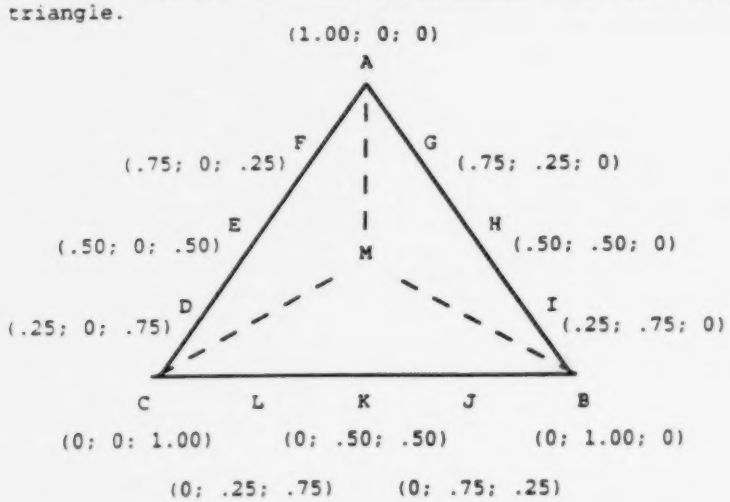
The IRT Response Triangle

The scaling factors A (-63.12) and B (33.00) in the IRT log formula generate the following awards for confidence in the correct answer.

Confidence	Actual	Approximate Score for Use in the Classroom	Interpretation of Information State
1.00	30.12	+30	Informed
.75	22.23	+20	Near Informed
.50	11.12	+10	Part Informed
.33	-.27	0	Uninformed
.25	-7.88	-10	Near Misinformed
0.00	-99.01	-100	Misinformed

IRT Point Awards

Conditional score triplets can then be associated with each response option on the IRT triangle.



Conditional Probability Triplets on the IRT Response Triangle

APPENDIX C

Total Item Analysis <<PRE-TEST and POSTTEST>>

Note: [1] = Pretest Scores, [2] = Posttest scores

Participant	% Weighted Total Score	% Inf-ormed	% Uninf-ormed	% Confident in Correct Information	Recommendation	Grade
T. Brown[1]	0.74	0.72	0.06	0.28	Uninformed - Instruction Needed	C-
T. Brown[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
W. Chun[1]	0.72	0.67	0.04	0.26	Uninformed - Instruction Needed	C-
W. Chun[2]	0.97	0.97	0.0	0.90	Fully Informed - Advance to next level	A
P. Euerle[1]	0.76	0.75	0.08	0.30	Uninformed - Instruction Needed	C-
P. Euerle[2]	0.97	1.00	0.0	0.92	Fully Informed - Advance to next level	A
S. Freeman[1]	0.75	0.50	0.10	0.29	Uninformed - Instruction Needed	C-
S. Freeman[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
C. Fyfe[1]	0.75	0.56	0.16	0.29	Uninformed - Instruction Needed	C-
C. Fyfe[2]	0.96	0.97	0.0	0.88	Fully Informed - Advance to next level	A
L. Gordon[1]	0.87	0.92	0.10	0.59	Near Informed - Some Review Needed	B
L. Gordon[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
A. Ifekwunigwe[1]	0.87	0.93	0.16	0.59	Near Informed - Some Review Needed	B
A. Ifekwunigwe[2]	0.99	1.00	0.02	0.98	Fully Informed - Advance to next level	A
M. Itkin[1]	0.93	0.95	0.04	0.76	Fully Informed - Advance to next level	A
M. Itkin[2]	0.96	0.97	0.0	0.89	Fully Informed - Advance to next level	A
S. Kramer[1]	0.92	1.00	0.08	0.75	Fully Informed - Advance to next level	A
S. Kramer[2]	0.95	0.96	0.0	0.86	Fully Informed - Advance to next level	A
B. Levitas[1]	0.91	0.92	0.04	0.69	Near Informed - Some Review Needed	B
B. Levitas[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
J. Martin[1]	0.79	0.75	0.14	0.37	Part Informed - Review and Instruction Needed	C +
J. Martin[2]	0.97	1.00	0.0	0.90	Fully Informed - Advance to next level	A
C. McFarland[1]	0.89	0.93	0.08	0.63	Near Informed - Some Review Needed	B
C. McFarland[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
C. Miyamoto[1]	0.86	0.87	0.0	0.55	Near Informed - Some Review Needed	B
C. Miyamoto[2]	0.97	0.97	0.0	0.90	Fully Informed - Advance to next level	A

Participant	% Weighted Total Score	% Inf.	% Uninf.	% Confident in Correct Information	Recommendation	Grade
J. Moore[1]	0.91	0.92	0.02	0.69	Near Informed - Some Review Needed	B
J. Moore[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
J. Moss[1]	0.86	0.88	0.08	0.54	Part Informed - Review and Instruction Needed	C +
J. Moss[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
C. Neel[1]	0.68	0.67	0.04	0.24	Part Misinformed - Some Reeducation Needed	D
C. Neel[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
D. Parks[1]	0.78	0.77	0.02	0.33	Part Informed - Review and Instruction Needed	C +
D. Parks[2]	1.00	1.00	0.0	0.0	Fully Informed -Advance to next level	A+
M. Perez[1]	0.91	0.93	0.04	0.70	Near Informed - Some Review Needed	B
M. Perez[2]	0.95	0.96	0.0	0.86	Fully Informed - Advance to next level	A
T. Price[1]	0.93	0.93	0.0	0.79	Fully Informed - Advance to next level	A
T. Price[2]	0.93	0.93	0.0	0.79	Fully Informed - Advacne to next level	A
L. Purdy[1]	0.89	0.93	0.06	0.66	Near Informed - Some Review Needed	B
L. Purdy[2]	0.99	1.00	0.0	0.96	Fully Informed - Advance to next level	A
G. Radvenis[1]	0.92	1.00	0.14	0.73	Near Informed - Sp,e Review Needed	B
G. Radvenis[2]	0.98	1.00	0.02	0.94	Fully Informed - Advance to next level	A
D. Rebeck[1]	0.91	0.92	0.0	0.70	Near Informed - Some Review Needed	B
D. Rebeck[2]	0.83	0.83	0.0	0.47	Part Informed - Review and Instruction Needed	C +
R. Rosenbaum[1]	0.78	0.73	0.10	0.34	Part Informed - Reveiw and Instruction Needed	C +
R. Rosenbaum[2]	0.97	0.97	0.0	0.90	Fully Informed - Advance to next level	A
M. Tervet[1]	0.90	0.94	0.10	0.67	Near Informed - Some Review Needed	B
M. Tervet[2]	0.98	1.00	0.0	0.94	Fully Informed -Advance to next level	A
M. Thoburn[1]	1.00	1.00	0.0	0.99	Fully Informed - Advance to next level	A
M. Thoburn[2]	0.96	1.00	0.0	0.88	Fully Informed - Advance to next level	A
K. Weiss[1]	0.85	0.92	0.22	0.52	Part Informed - Review and Instruction Needed	C +
K. Weiss[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+
L Wilcox[1]	0.88	0.92	0.0	0.60	Near Informed - Some Review Needed	B
L. Wilcox[2]	0.99	1.00	0.0	0.99	Fully Informed - Advance to next level	A
I. Yee[1]	0.82	0.83	0.20	0.42	Part Informed - Review and Instruction Needed	C +
I. Yee[2]	1.00	1.00	0.0	1.00	Fully Informed - Advance to next level	A+

APPENDIX D

TABLE 1. Test Item by Test Item/Concept by Concept <<PRETEST>>

		Information State (in numbers of participants)						
Item #	Concept Near Misinf.	Informed	Near Inf. Misinf.		Part Inf.		Uninf.	
1	What How and For Whom	25	0	3	1	0	1	
2	Scarcity/ Opp. Cost	13	4	7	3	0	3	
3	Diminishing Return	8	2	3	6	2	9	
4	Profit	17	6	3	1	1	2	
5	Business Revenues & Cost	6	7	8	4	1	4	
6	Comparative Advantage	20	2	1	6	0	1	
7	Taxes	13	1	6	4	1	5	
8	Substitutes	24	2	3	0	0	1	
9	Shortages	14	4	2	5	2	3	
10	Surpluses	28	1	0	0	0	1	
11	Demand	9	11	8	1	0	1	
12	Shortages	6	8	7	3	0	6	
13	Income Distrib.	29	0	0	1	0	0	
14	Monopolies	15	5	1	3	1	5	
15	Competitive Markets	21	5	3	1	0	0	
16	Law of Demand	22	2	2	2	2	0	
17	Increase in Demand	23	1	2	0	0	4	
18	Scarcity/ Opp. Cost	16	7	0	3	1	3	
19	Inflation	11	3	6	5	1	4	
20	G.N.P. Definitions	16	6	5	1	0	2	
21	Adjusting G.N.P.	10	4	9	5	0	3	
22	Creation of Money-Banking	10	4	9	5	0	2	
23	Money Supply	4	1	2	12	0	11	
24	Gov't Budget Deficits	25	4	0	1	0	0	
25	G.N.P.	6	3	9	9	0	3	
26	Consumer Spending	26	3	1	0	0	0	
27	Value of Labor	10	4	4	6	0	6	
28	Investment	10	5	7	6	2	0	
29	Collective Bargaining	20	5	2	3	0	0	
30	Nature of Corp.'s	10	3	3	9	2	3	

APPENDIX E

EXAMINEE INDIVIDUAL EDUCATION PLAN(IEP)

EXAMINEE NAME WEISS KAREN
EXAM NAME PRE TEST ECONOMICS EDUCATION -LITERACY E
EXAM CODE 1
SCHOOL NAME ECON ED TRAINING SEMINAR
SCHOOL SITE CODE 1
INSTRUCTOR NAME DR. MARILYN KOURILSKY
NUMBER OF QUESTIONS 30
PROCESSING CODE(A=MCW-APM B=MCW-APM AND RW) =A

FORMATIVE EVALUATION

EXAMINEE MISINFORMATION ON EXAMINATION

CONCEPTS WHERE YOU WERE SURE OF AN ANSWER BUT WERE WRONG

HAVE INSTRUCTOR EXPLAIN WHY THE ANSWER YOU THOUGHT WAS CORRECT WAS WRONG AND WHY ANOTHER ANSWER WAS CORRECT

TEST ITEM(INF STATE)	DESCRIPTION INSTRUCTIONAL CROSS REFE RENCE
8 M	SUBSTITUTES K&D CHAPTER 3

EXAMINEE UNINFORMED (LACKS INFORMATION) RESPONSES

CONCEPTS THAT YOU SAID YOU DIDNT KNOW-HAVE YOUR INSTRUCTOR EXPLAIN THESE CONCEPTS TO YOU

TEST ITEM(INF STATE)	DESCRIPTION -INSTRUCTIONAL CROSS REFERENCE
2 U	SCARCITY/OPPORTUNITY COST K&D CHAPTER 1
6 U	COMPARATIVE ADVANTAGE K&D CHAPTER 14
9 U	SHORTAGES K&D CHAPTER 6
15 U	COMPETITIVE MARKETS K&D CHAPTER 6
21 U	ADJUSTING G.N.P. K&D CHAPTER 12
23 U	MONEY SUPPLY K&D CHAPTER 12
25 U	G.N.P. K&D CHAPTER 11
27 U	VALUE OF LABOR K&D CHAPTER 9
28 U	INVESTMENT K&D CHAPTER 11
29 U	COLLECTIVE BARGANING K&D CHAPTER 10
30 U	NATURE OF CORPORATIONS K&D CHAPTER 7

EXAMINEE PARTIALLY INFORMED ITEMS ON EXAMINATION

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CONCEPTS WHERE YOU WERENT SURE OF THE ANSWER-HAVE YOUR
INSTRUCTOR REVIEW THESE CONCEPTS WITH YOU )

TEST  ITEM (INF STATE)    DESCRIPTION INSTRUCCTIONAL CROSS REFERENCE
   4  W                    PROFIT
                           K&D CHAPTER 7
   5  P                    BUSINESS REVENUES AND COST
                           K&D CHAPTER 11
  11  P                    DEMAND
                           K&D CHAPTER 5
  12  P                    SHORTAGES
                           K&D CHAPTER 7
  17  P                    INCREASE IN DEMAND
                           K&D CHAPTER 4
  19  P    *               INFLATION
                           K&D CHAPTER 13

EXAMINEE FULLY INFORMED CONCEPTS(RELIABLE INFORMATION)

CONCEPTS THAT YOU SAID YOU WERE SURE OF THE ANSWER AND THAT
ANSWER WAS CORRECT-YOU HAVE RELIABLE INFORMATION IN THESE
AREAS-KEEP UP THE GOOD WORK
TEST  ITEM(INF STATE)     DESCRIPTION -INSTRUCTIONAL CROSS REFERENCE
   1  I                    WHAT HOW AND FOR WHOM
                           K&D CHAPTER 2
   3  I                    DIMINISHING RETURN
                           K&D CHAPTER 9
   7  I                    TAXES
                           K&D CHAPTER 8
  10  I                    SURPLUSES
                           K&D CHAPTER 6
  13  I                    INCOME DISTRIBUTION
                           K&D CHAPTER 11
  14  I                    MONOPOLIES
                           K&D CHAPTER 8
  16  I                    LAW OF DEMAND
                           K&D CHAPTER 3
  18  I                    SCARCITY AND OPPORTUNITY COST
                           K&D CHAPTER 1
  20  I                    G.N.P. DEFINITIONS
                           K&D CHAPTER 11
  22  I                    CREATION OF MONEY-BANKING
                           K&D CHAPTER 12
  24  I                    GOVERNMENT BUDGET DEFICITS
                           K&D CHAPTER 13
  26  I                    CONSUMER SPENDING
                           K&D CHAPTER 11
STUDENT COGNITIVE MAP


PERCENT INFORMED              0.40
PERCENT UNINFORMED            0.37
PERCENT PART INFORMED         0.20
PERCENT MISINFORMED           0.03
PERCENT RIGHT WITH RW         0.0
PERCENT WRONG WITH RW         0.0
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FST/2/18/93

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EXAMINEE INDIVIDUAL EDUCATION PLAN(IEP)

EXAMINEE NAME          WEISS KAREN
EXAM NAME               POST TEST ECONOMICS EDUCATION -LITERACY
EXAM CODE               2
SCHOOL NAME             ECON ED TRAINING SEMINAR
SCHOOL SITE CODE           1
INSTRUCTOR NAME         DR. MARILYN KOURILSKY
NUMBER OF QUESTIONS     30
PROCESSING CODE(A=MCW-APM  B=MCW-APM AND RW)  =A
-------------------------------------------------------
YOUR IEP IS DIVIDED INTO TWO SECTIONS-

(1) SUMMATIVE EVALUATION -HOW YOU PERFORMED ON THE TEST
                          BOTH WITH RW AND MCW-APM  SCORING
                          IF APPLICABLE OR JUST MCW-APM
(2) FORMATIVE EVALUATION -WHAT CONCEPT AREAS NEED TUTORING
                         (INSTRUCTION-REEDUCATION-REVIEW)


     (1)SUMMATIVE EVALUATION WITH MCW-APM

INFORMATION REFERENCE ASSESSMENT OF PERFORMANCE (MCW-APM)

MCW-APM SCORE(CONFIDENCE+ACCURACY)                    1.00
%CORRECT WHEN CERTAIN OF AN ANSWER                    1.00

AVERAGE CONFIDENCE IN CORRECT INFORMATION ON EXAMINATION      1.00

OVERALL (IRT) STANDARD OF MASTERY-    FULLY INFORMED
RECOMMENDED GRADE                       A+
(FULL MASTERY)

OVERALL (IRT) STANDARD OF MASTERY-    INFORMED-ADVANCE
RECOMMENDED (IRT) GRADE                 A
(ACCURATE AND CONFIDENT INFORMATION)


NUMBER OF M(UNINFORMED) RESPONSES          0.
PERCENT                                  0.0

NUMBER OF BLANK RESPONSES                  0.
PERCENT                                  0.0

-------------------------------------------------------
           FORMATIVE EVALUATION
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EXAMINEE MISINFORMATION ON EXAMINATION

CONCEPTS WHERE YOU WERE SURE OF AN ANSWER BUT WERE WRONG

HAVE INSTRUCTOR EXPLAIN WHY THE ANSWER YOU THOUGHT WAS
CORRECT WAS WRONG AND WHY ANOTHER ANSWER WAS CORRECT


TEST ITEM(INF STATE)     DESCRIPTION INSTRUCTIONAL CROSS REFE RENCE
```

EXAMINEE UNINFORMED (LACKS INFORMATION) RESPONSES

CONCEPTS THAT YOU SAID YOU DIDNT KNOW-HAVE YOUR INSTRUCTOR
EXPLAIN THESE CONCEPTS TO YOU

TEST ITEM(INF STATE) DESCRIPTION -INSTRUCTIONAL CROSS REFERENCE

EXAMINEE PARTIALLY INFORMED !TEMS ON EXAMINATION

CONCEPTS WHERE YOU WERENT SURE OF THE ANSWER-HAVE YOUR
INSTRUCTOR REVIEW THESE CONCEPTS WITH YOU)

TEST ITEM (INF STATE) DESCRIPTION INSTRUCCTIONAL CROSS REFERENCE